

(19)



(11)

EP 4 173 511 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:

25.09.2024 Bulletin 2024/39

(21) Application number: **21829672.1**

(22) Date of filing: **13.04.2021**

(51) International Patent Classification (IPC):

A41D 13/002 ^(2006.01) **A41D 13/12** ^(2006.01)
A41D 27/00 ^(2006.01) **A41D 27/28** ^(2006.01)
A62B 17/00 ^(2006.01) **A62B 18/00** ^(2006.01)
F04D 29/60 ^(2006.01)

(52) Cooperative Patent Classification (CPC):

A41D 13/1218; A41D 13/0025; A41D 27/28;
A62B 17/006; A62B 18/006; F04D 29/602

(86) International application number:

PCT/CN2021/086763

(87) International publication number:

WO 2021/258816 (30.12.2021 Gazette 2021/52)

(54) **PROTECTIVE SUIT HAVING AIR SUPPLY DEVICE**

SCHUTZANZUG MIT LUFTZUFÜHREINRICHTUNG

COMBINAISON DE PROTECTION AYANT UN DISPOSITIF D'ALIMENTATION EN AIR

(84) Designated Contracting States:

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR

(30) Priority: **24.06.2020 CN 202021195343 U**

(43) Date of publication of application:

03.05.2023 Bulletin 2023/18

(73) Proprietor: **Henan Tuoren Medical Device Co., Ltd**
Xinxiang, Henan 453400 (CN)

(72) Inventors:

- **XU, Zhenfeng**
Xinxiang, Henan 453400 (CN)
- **CHANG, Shengwei**
Xinxiang, Henan 453400 (CN)
- **ZENG, Juhua**
Xinxiang, Henan 453400 (CN)
- **CHENG, Wensheng**
Xinxiang, Henan 453400 (CN)

• **ZHONG, Ying**

Xinxiang, Henan 453400 (CN)

• **CHEN, Chuanli**

Xinxiang, Henan 453400 (CN)

• **WANG, Minghui**

Xinxiang, Henan 453400 (CN)

(74) Representative: **Zaboliene, Reda**

Metida

Business center Vertas

Gyneju str. 16

01109 Vilnius (LT)

(56) References cited:

EP-A1- 2 818 204 CN-U- 210 020 900
CN-U- 212 571 169 CN-U- 212 757 770
CN-Y- 2 631 246 CN-Y- 2 730 167
CN-Y- 2 730 167 CN-Y- 2 770 703
JP-A- 2004 014 308 JP-A- H0 945 300
KR-B1- 101 840 600

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

TECHNICAL FIELD

[0001] The present disclosure relates to a medical protective instrument, in particular to a protective suit with an air supply device.

BACKGROUND

[0002] In the medical field, medical workers need to wear airtight protective suits to protect themselves from germs. However, the air inside the protective suit does not ventilate, so a muggy environment is easy to form inside the protective suit during long-time wearing process. After the medical workers sweat, the protective suits are easy to attach to the medical workers, which is not good for the medical workers to maintain good working conditions. In order to solve the above problem, researchers have designed to combine a filter air supply device with a medical protective suit, so as to improve the working comfort of the medical workers.

[0003] CN2730167Y discloses a multifunctional safety protective suit according to the preamble of claim 1.

[0004] EP2818204A1 discloses a cooling device for chemical protective clothing and/or circulating respirator.

[0005] KR101840600B1 discloses a protective suit.

SUMMARY

[0006] For the deficiencies in the prior art, the purpose of the present disclosure is to provide a protective suit with an air supply device.

[0007] In order to implement the above purpose, the present disclosure adopts the technical solution below: The invention provides a protective suit with an air supply device, including a tops portion, a bottoms portion and a transparent head cover which are arranged integrally, wherein the tops portion is provided with a breathing tube, which is communicated with an internal environment of the protective suit, and an air inlet of the breathing tube is communicated with the air supply device; and an exhaust filter device is arranged at a top of the transparent head cover.

[0008] Preferably, the bottoms portion is provided with a dressing opening, which stretches upwards to the transparent head cover, a zipper is arranged in the dressing opening, and a starting point of the zipper is located at a lower end of the dressing opening while an end point is located at an upper end of the dressing opening.

[0009] Preferably, the protective suit is a three-layer structure, wherein the outer layer is an anti-scratch layer, the middle layer is an isolation layer, and the inner layer is a bacteriostatic layer.

[0010] Preferably, a waistband is arranged at a joint of the tops portion and the bottoms portion, a suspending portion is arranged on the air supply device, and the air supply device is installed on the waistband through the

suspending portion.

[0011] According to the invention, the air supply device includes a top cover and a bottom shell, wherein a filter box, a filter lower shell, a blower and a battery for driving the blower to rotate are arranged between the top cover and the bottom shell; the filter box is located between the top cover and the filter lower shell, the blower and the battery are located between the filter lower shell and the bottom shell, a battery slot is arranged inside the bottom shell, and edges of the top cover, the filter lower shell and the bottom shell are buckled; in a buckling state, the battery slot and the filter lower shell form a battery cavity capable of clamping the battery, a battery opening and a battery lid are arranged at a side part of the filter lower shell correspondingly to the battery cavity, one side of the battery lid is hinged with the battery opening, the other side relative to the hinge side is provided with a clamping portion, and a first elastic member is arranged inside an inner wall of the battery cavity relative to the battery lid; a side part adjacent to the battery lid inside the battery cavity is hinged with a hook, and a torsional spring is arranged on a hinge shaft of the hook; and in the buckling state, the battery is clamped between the hook and the first elastic member, and the clamping portion of the battery lid is clamped between the battery cavity and the hook.

[0012] Preferably, a locking portion is arranged inside the battery lid, the locking portion is in parallel connection with an operation portion arranged outside the battery lid, an installing slot is arranged on the battery lid, a second elastic member is arranged inside the installing slot, a top of the installing slot is provided with a through hole correspondingly to the locking portion, the locking portion is connected to a free end of the second elastic member and can slide along the installing slot, and in a locking state, a top end of the locking portion stretches out of the installing slot and resists to a side wall of the battery cavity.

[0013] Preferably, one end of the clamping portion is provided with a clamping connection base, which is installed on an inner wall of the battery lid and provided with the installing slot, the battery lid is provided with an operation hole correspondingly to the operation portion, and the operation portion passes through the operation hole and one end of the operation portion stretches into the installing slot and is connected to the locking portion.

[0014] Preferably, the hook is a Z-shaped structure, which includes a fastening portion located at one end, a hinge portion located at the other end, and a connecting portion connected to the fastening portion and the hinge portion.

[0015] Preferably, an obtuse angle is formed between the hinge portion and the connecting portion, and the fastening portion is vertical to the connecting portion; and a connecting position of the fastening portion and the connecting portion is set as an inclined surface, an outer end face of the fastening portion is a plane, the plane intersects with the inclined surface to form an obtuse an-

gle tip, and the clamping portion is provided with an obtuse angle slot correspondingly to the obtuse angle tip.

[0016] Preferably, the second elastic member includes first springs arranged at two sides of a bottom of the locking portion installing slot, the two sides of the bottom end of the locking portion are provided with connecting ear plates in respective, and the connecting ear plates are connected to free ends of the first springs.

[0017] Preferably, two sides of the second elastic member are provided with chutes, and one end of each chute is provided with an opening capable of containing the locking portion to slide only, and the other end of each chute is provided with a limiting member correspondingly to each first spring.

[0018] Preferably, the filter box includes an filter upper shell, which is an inverted groove shape, a filter membrane is arranged in the groove shape, a lower end opening of the groove shape is provided with a sealing cover, the filter upper shell is buckled with the filter lower shell, and a filter membrane rubber mat is arranged in a buckling gap.

[0019] Preferably, the filter upper shell is hung with one end of the filter lower shell, the other end of the filter upper shell is provided with a bolt, the filter lower shell is provided with a locking portion correspondingly to the bolt, the locking portion includes a key fixing frame arranged at a lower side of the filter lower shell, the key fixing frame is connected to a locking key through a third elastic member, the locking key and the filter lower shell are provided with bolt holes correspondingly to the bolt, the bolt bends and stretches inside the filter upper shell to form a hanging portion, and an inner end face of the locking key bends and stretches to the bolt holes and forms a limiting portion, and the limiting portion corresponds to the bolt.

[0020] Preferably, the hanging portion is vertical to the bolt to form a straight hook, and the limiting portion is obliquely arranged.

[0021] Preferably, the third elastic member includes a second spring, two sides of the locking key stretch out of a mounting portion, the mounting portion is provided with a guide column correspondingly to the second spring, and the guide column stretches into the second spring to be coaxial with the second spring.

[0022] Preferably, an upper side of the filter lower shell is a U-shaped groove structure and fits with the filter upper shell, a lower side of the filter lower shell is an inverted U-shaped structure and fits with the bottom shell, and the upper side of the filter lower shell is vertical to a U-shaped section of the lower side; and a side wall of the inverted U-shaped structure is provided with mounting holes, which correspond to outer end faces of the battery lid and the locking key, and the battery lid and the locking key are located at two side walls of the inverted U-shaped structure in respective.

[0023] Preferably, two sides of the bolt hole of the U-shaped groove are provided with a plurality of locating columns, and a cap peak is provided with locating holes correspondingly to the locating columns.

[0024] Compared with the prior art, the present disclosure has substantive features and progress. Specifically, the present disclosure provides the protective suit with the air supply device, the muggy feeling inside the protective suit may be reduced through the air supply device. The head adopts the fully transparent materials, with a clear view, so the oppression of the wearing personnel is reduced. The long zipper is arranged at the side of the protective suit, which is convenient for wearing and ensures single-person sterile operation. Further, the battery is arranged inside the air supply device, the battery lid is arranged at the side of the air supply device, and during use, the itself shell of the air supply device is combined with the hook stirrup for bearing, instead of adopting a single battery lid for bearing, so the bearing capacity is stronger. The large capacity battery with the greater weight may be adopted according to needs, so as to meet the endurance needs of the air supply device. Further, hanging columns of the filter upper shell and the filter lower shell in the air supply device are hung with the claw hooks, to rotate clockwise. The bolt of the filter upper shell contacts with the bolt hole of the filter lower shell, to extrude the limiting portion of the locking key to move, the third elastic member is compressed, the hanging portion is hung with the limiting portion together so as to complete the locking of the filter upper shell and the filter lower shell, and at this time, the locating columns are clamped in the locating holes correspondingly. When disassembly is required, the locking key is pressed inwards, the hanging portion is separated from the limiting portion, namely, the filter upper shell may be disassembled, so that the disassembly and replacement are convenient to carry out when the filter performance of the filter box is reduced. In addition, the filter box is sealed in a manner that a sealant is combined with a sealing gasket, so as to avoid air entering the air supply device without passing through the filter membrane, thereby reducing the using risk.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025]

FIG. 1 is a structural schematic diagram of the present disclosure.

FIG. 2 is a structural schematic diagram of an air supply device of the present disclosure.

FIG. 3 is a structural schematic diagram of a battery cavity of the present disclosure.

FIG. 4 is a structural schematic diagram of a battery lid, a clamping portion and a locking portion in a cooperation state of the present disclosure.

FIG. 5 is a structural schematic diagram of a clamping connection base of the present disclosure.

FIG. 6 is a structural schematic diagram of a locking portion installing slot of the present disclosure.

FIG. 7 is a structural schematic diagram of a filter upper shell fitting with a filter lower shell of the

present disclosure.

FIG. 8 is a structural schematic diagram of a locking portion of the present disclosure.

FIG. 9 is a schematic diagram of an overall structure of an air supply device of the present disclosure (I).

FIG. 10 is a schematic diagram of an overall structure of an air supply device of the present disclosure (II).

FIG. 11 is a schematic diagram of an overall structure of an air supply device of the present disclosure (III).

[0026] In the drawing: 10. Tops portion, 20. Bottoms portion, 21. Waistband, 30. Air supply device, 31. Suspending portion, 40. Dressing opening, 50. Transparent head cover, 60. Breathing tube, 70. Exhaust filter device, 80. Zipper, 1. Filter upper shell, 11. Filter membrane, 12. Sealing cover, 13. Filter membrane rubber mat, 14. Filter lower shell, 2. Blower, 3. First joint, 4. Sealing washer, 5. Second joint, 6. Air duct, 7. Bottom shell, 71. Battery slot, 72. Battery cavity, 73. Battery opening, 74. Air outlet, 8. Top cover, 9. Filter box, 101. Torsional spring, 102. Hinge shaft, 103. Hook, 1031. Fastening portion, 1032. Hinge portion, 1033. Connecting portion, 1034. Obtuse angle tip, 104. Clamping portion, 1040. Obtuse angle slot, 1041. Clamping connection base, 1042. Installing slot, 1043. Locking portion, 1044. Second elastic member, 1045. Operation portion, 1046. First spring, 1047. Connecting ear plate, 1048. Chute, 1049. Opening, 1050. Limiting member, 105. Battery lid, 1051. Mounting hole, 1052. Through hole, 1053. Operation hole, 106. First elastic member, 107. Battery, 108. Female joint, 109. Male joint, 202. Bolt, 2021. Bolt hole, 2022. Locking key, 20221. Mounting hole, 2023. Key fixing frame, 2024. Mounting portion, 2025. Guide column, 2026. Third elastic member, 2027. Limiting portion, 2028. Hanging portion, 2029. Second spring, 203. Claw hook, 204. Locating hole, 205. Locating column, 206. Hanging column, 207. Locking portion, 208. Cap peak.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0027] The technical solution of the present disclosure is further described in details below through the specific implementation modes.

[0028] As shown in FIG. 1 to FIG. 11, this embodiment provides a protective suit with an air supply device, including a tops portion 10, a bottoms portion 20 and a transparent head cover 50 which are arranged integrally, wherein the tops portion 10 is provided with a breathing tube 60, which is communicated with an internal environment of the protective suit, and an air inlet of the breathing tube 60 is communicated with the air supply device 30; and an exhaust filter device 70 is arranged at a top of the transparent head cover 50. The air supply device 30 may reduce the muggy feeling inside the protective suit, and the head adopts fully transparent materials, with a clear view, so the oppression of wearing personnel can be reduced.

[0029] Further, the bottoms portion 20 is provided with

a dressing opening 40, which stretches upwards to the transparent head cover 50, a zipper 80 is arranged in the dressing opening 40, and a starting point of the zipper 80 is located at a lower end of the dressing opening 40 while an end point is located at an upper end of the dressing opening 40, which is convenient for wearing and ensures single-person sterile operation.

[0030] Further, the protective suit is a three-layer structure, wherein the outer layer is an anti-scratch layer, the middle layer is an isolation layer, and the inner layer is a bacteriostatic layer. The multi-layer structural setting may prolong the service life, and the protective suit may be used repeatedly after being cleaned and disinfected. Specifically, the middle layer may adopt a plastic film with a function of isolating virus and germ, and the inner layer may adopt a spinneret with a bacteriostasis function.

[0031] Further, a waistband 21 is arranged at a joint of the tops portion 10 and the bottoms portion 20, a suspending portion 31 is arranged on the air supply device 30, and the air supply device 30 is installed on the waistband 21 through the suspending portion 31.

[0032] Specifically, the air supply device 30 includes a top cover 8 and a bottom shell 7, wherein a filter box 9, a filter lower shell 14, a blower 2 and a battery 107 for driving the blower 2 to rotate are arranged between the top cover 8 and the bottom shell 7; the filter box 9 is located between the top cover 8 and the filter lower shell 14, the blower 2 and the battery 107 are located between the filter lower shell 14 and the bottom shell 7, a battery slot 71 is arranged inside the bottom shell 7, and edges of the top cover 8, the filter lower shell 14 and the bottom shell 7 are buckled; in a buckling state, the battery slot 71 and the filter lower shell 14 form a battery cavity 72 capable of clamping the battery 107, a battery opening 73 is arranged at a side part of the filter lower shell 14 correspondingly to the battery cavity 72, a battery lid 105 is arranged correspondingly to the battery opening 73, one side of the battery lid 105 is hinged with the battery opening 73, the other side relative to the hinge side is provided with a clamping portion 104, and a first elastic member 106 is arranged inside an inner wall of the battery cavity 72 relative to the battery lid 105; a side part adjacent to the battery lid 105 inside the battery cavity 72 is hinged with a hook 103, and a torsional spring 101 is arranged on a hinge shaft 102 of the hook 103; and in the buckling state, the battery 107 is clamped between the hook 103 and the first elastic member 106, and the clamping portion 104 of the battery lid 105 is clamped between the battery cavity 72 and the hook 103. Preferably, the first elastic member 106 may adopt a conical spring.

[0033] Further, a locking portion 1043 is arranged inside the battery lid 105, the locking portion 1043 is in parallel connection with an operation portion 1045 arranged outside the battery lid 105, a locking portion installing slot 1042 is arranged on the battery lid 105, a second elastic member 1044 is arranged inside the installing slot 1042, a top of the installing slot 1042 is pro-

vided with a through hole 1052 correspondingly to the locking portion 1043, the locking portion 1043 is connected to a free end of the second elastic member 1044 and can slide along the installing slot 1042, and in a locking state, a top end of the locking portion 1043 stretches out of the installing slot 1042 and resists to a side wall of the battery cavity 72.

[0034] Further, one end of the clamping portion 104 is provided with a clamping connection base 1041, which is installed on an inner wall of the battery lid 105 and provided with the installing slot 1042, the battery lid 105 is provided with an operation hole 1053 correspondingly to the operation portion 1045, and the operation portion 1045 passes through the operation hole 1053 and one end of the operation portion 1045 stretches into the installing slot 1042 and is connected to the locking portion 1043.

[0035] Further, the hook 103 is a Z-shaped structure, which includes a fastening portion 1031 located at one end, a hinge portion 1032 located at the other end, and a connecting portion 1033 connected to the fastening portion 1031 and the hinge portion 1032, an obtuse angle is formed between the hinge portion 1032 and the connecting portion 1033, and the fastening portion 1031 is vertical to the connecting portion 1033.

[0036] Further, a connecting position of the fastening portion 1031 and the connecting portion 1033 is set as an inclined surface, an outer end face of the fastening portion 1031 is a plane, the plane intersects with the inclined surface to form an obtuse angle tip 1034, and the clamping portion 104 is provided with an obtuse angle slot 1040 correspondingly to the obtuse angle tip 1034.

[0037] Further, the second elastic member 1044 includes first springs 1046 arranged at two sides of a bottom of the locking portion installing slot 1042, the two sides of the bottom end of the locking portion 1043 are provided with connecting ear plates 1047 in respective, and the connecting ear plates 1047 are connected to free ends of the first springs 1046. Two sides of the second elastic member 1044 are provided with chutes 1048, and one end of each chute 1048 is provided with an opening 1049 capable of containing the locking portion 1043 to slide only, and the other end of each chute 1048 is provided with a limiting member 1050 correspondingly to each first spring 1046.

[0038] The battery 107 is arranged inside the air supply device 30 and the battery lid 105 is arranged at the side of the air supply device 30, so the itself shell of the air supply device 30 is combined with the hook 103 stirrup for bearing, instead of adopting a single battery lid 105 for bearing during use, so the bearing capacity is stronger. The large capacity battery with the greater weight may be adopted according to needs, so as to meet the endurance needs of the air supply device 30.

[0039] Specifically, when the battery 107 is installed, the operation portion 1045 is required to move firstly, the second elastic member 1044 is compressed, the locking portion 1043 is separated from the position fitting with

the battery cavity 72, the operation portion 1045 is buckled to rotate anticlockwise, and the battery lid 105 is completely opened to take out the battery 107, so that a big round corner position of the battery 107 is aligned with the corresponding round corner inside the battery cavity 72 and slides into the battery cavity 72. One end of the used battery 107 resists to the first elastic member 106, so that the hook 103 is buckled at the other end of the battery 107 after rotating a certain angle around the hinge shaft 102. Due to the elastic action of the torsional spring 101, the hook 103 will buckle the edge of the battery 107 to prevent the battery 107 from moving, and then the battery lid 105 is buckled, the clamping portion 104 of the battery lid 105 is clamped between the hook 103 and the battery cavity 72, so as to prevent the poor contact between a female joint 108 and a male joint 109 caused by the battery 107 disengagement due to loosened torsional spring 101, without affecting the normal use of the device.

[0040] Further, the filter box 9 includes a filter upper shell 1, which is an inverted groove shape, a filter membrane 11 is arranged in the inverted groove shape, a lower end opening of the groove shape is provided with a sealing cover 12, the filter upper shell 1 is buckled with the filter lower shell 14, and a filter membrane rubber mat 13 is arranged in a buckle gap. The filter upper shell 1 is hung with one end of the filter lower shell 14, the other end of the filter upper shell 1 is provided with a bolt 202, the filter lower shell 14 is provided with a locking portion 207 correspondingly to the bolt 202, the locking portion 207 includes a key fixing frame 2023 arranged at a lower side of the filter lower shell 14, the key fixing frame 2023 is connected to a locking key 2022 through a third elastic member 2026, the locking key 2022 and the filter lower shell 14 are provided with bolt holes 2021 correspondingly to the bolt 202, the bolt 202 bends and stretches inside the filter upper shell 1 to form a hanging portion 2028, and an inner end face of the locking key 2022 bends and stretches to the bolt holes 2021 and forms a limiting portion 2027, and the limiting portion 2027 corresponds to the bolt 202.

[0041] Preferably, the hanging portion 2028 is vertical to the bolt 202 to form a straight hook, and the limiting portion 2027 is obliquely arranged.

[0042] Further, the third elastic member 2026 includes a second spring 2029, two sides of the locking key 2022 stretch out of a mounting portion 2024, the mounting portion 2024 is provided with a guide column 2025 correspondingly to the second spring 2029, and the guide column 2025 stretches into the second spring 2029 to be coaxial with the second spring 2029.

[0043] Further, a cap peak 208 which is vertical to a groove-shaped side wall is arranged at an opened edge of the filter upper shell 1, the bolt 202 is located at a lower side of the cap peak 208 and vertical to the cap peak 208, the groove-shaped side wall is provided with hanging columns 206, and one end of an upper side of the filter lower shell 14 is provided with claw hooks 203 cor-

respondingly to the hanging columns 206.

[0044] Further, an upper side of the filter lower shell 14 is a U-shaped groove structure and fits with the filter upper shell 1, a lower side of the filter lower shell 14 is an inverted U-shaped structure and fits with the bottom shell 7, and the upper side of the filter lower shell 14 is vertical to a U-shaped section of the lower side; and a side wall of the inverted U-shaped structure is provided with mounting holes 1051, which correspond to outer end faces of the battery lid 105 and the locking key 2022, and the battery lid 105 and the locking key 2022 are located at two side walls of the inverted U-shaped structure in respective. Two sides of the bolt hole 2021 of the U-shaped groove are provided with a plurality of locating columns 205, and the cap peak 208 is provided with locating holes 204 correspondingly to the locating columns 205.

[0045] During a specific assembly process, the hanging columns 206 of the filter upper shell 1 and the filter lower shell 14 are hung with the claw hooks 203, and rotate clockwise, the bolt 202 of the filter upper shell 1 contacts with the bolt hole 2021 of the filter lower shell 14, the limiting portion 2027 of the locking key 2022 is extruded to move, the third elastic member 2026 is compressed, the hanging portion 2028 is hung with the limiting portion 2027 so as to complete the locking of the filter upper shell 1 and the filter lower shell 14, and at this time, the locating columns 205 are clamped into the locating holes 204 correspondingly. When disassembly is required, the locking key 2022 is pressed inwards, the hanging portion 2028 is separated from the limiting portion 2027, namely, the filter upper shell 1 may be disassembled, so that the disassembly and replacement are convenient to carry out when the filter performance of the filter box 9 is reduced.

[0046] Preferably, the filter membrane 11 is adhered to the filter upper shell 1 through a sealant, an air duct 6 is arranged between the filter lower shell 14 and the bottom shell 7, the air duct 6 and the blower 2 are buckled with the filter lower shell 14 through screws, and the sealant is applied at a connecting gap. A first joint 3 is arranged in an air outlet 74, the first joint 3 is clamped between the air duct 6 and the filter lower shell 14 to connect an exhaust outlet of blower 2, and the sealant is applied at the connecting gap. Further, one end of the first joint 3 is connected to an external second joint 5 through a sealing washer 4.

[0047] During assembly, the filter membrane 11 is firstly arranged inside the filter upper shell 1, the sealant is applied to a part where the filter upper shell 1 fits with the filter membrane 11, and then the sealing cover 12 is buckled to a lower surface of the filter upper shell 1, so that the filter membrane 11 is sealed inside the filter upper shell 1. Since the matching gap between the filter membrane 11 and the filter upper shell 1 is sealed through the sealant, the air may be ensured to enter the air supply device 0 only through the upper surface of the filter upper shell 1, so as to avoid air entering the air supply device

30 without passing through the filter membrane 11, and reduce the using risk. The filter membrane rubber mat 13 is adhered to the bottom of the filter upper shell 1, thus when the filter upper shell 1 assembled with the filter membrane 11, the sealing cover 12 and the filter membrane rubber mat 13 is buckled with the filter lower shell 14, the membrane filter rubber mat 13 is extruded so that the filter upper shell 1 is buckled with the filter lower shell 14, and the air-tightness of the filter box 9 may be ensured completely.

[0048] Finally, it is noted that the above embodiments are merely used for illustrating the technical solution of the present disclosure instead of limiting it. Although the present disclosure is described in details with reference to the preferred embodiments, those of ordinary skill in the art should understand that they can make modifications to the specific implementation modes of the present disclosure or make equal replacements to some technical features within the scope of the claims.

Claims

1. A protective suit with an air supply device, comprising a tops portion (10), a bottoms portion (20) and a transparent head cover (50) which are arranged integrally, wherein the tops portion (10) is provided with a breathing tube (60), which is communicated with an internal environment of the protective suit, and an air inlet of the breathing tube (60) is communicated with the air supply device (30); **characterized in that** an exhaust filter device (70) is arranged at a top of the transparent head cover (50), wherein the air supply device (30) comprises a top cover (8) and a bottom shell (7); a filter box (9), a filter lower shell (14), a blower (2) and a battery (1077) for driving the blower (2) to rotate are arranged between the top cover (8) and the bottom shell (7); the filter box (9) is located between the top cover (8) and the filter lower shell (14), the blower (22) and the battery (107) are located between the filter lower shell (14) and the bottom shell (7), a battery slot (71) is arranged inside the bottom shell (7), and edges of the top cover (8), the filter lower shell (14) and the bottom shell (7) are buckled; in a buckling state, the battery slot (71) and the filter lower shell (14) form a battery cavity (72) capable of clamping the battery (107), a battery opening (73) and a battery lid (105) are arranged at a side part of the filter lower shell (14) correspondingly to the battery cavity (72), one side of the battery lid (105) is hinged with the battery opening (73), the other side relative to the hinge side is provided with a clamping portion (104), and a first elastic member (106) is arranged inside an inner wall of the battery cavity (72) relative to the battery lid (105); a side part adjacent to the battery lid (105) inside the battery cavity (72) is hinged with a hook (103), and a torsional spring (101)

- is arranged on a hinge shaft (102) of the hook (103); and in the buckling state, the battery (107) is clamped between the hook (103) and the first elastic member (106), and the clamping portion (104) of the battery lid (105) is clamped between the battery cavity (72) and the hook (103).
2. The protective suit with the air supply device according to claim 1, wherein the bottoms portion (20) is provided with a dressing opening (40), which stretches upwards to the transparent head cover (50), a zipper (80) is arranged in the dressing opening (40), and a starting point of the zipper (80) is located at a lower end of the dressing opening (40) while an end point is located at an upper end of the dressing opening (40).
 3. The protective suit with the air supply device according to claim 1, wherein the protective suit is a three-layer structure, the outer layer is an anti-scratch layer, the middle layer is an isolation layer, and the inner layer is a bacteriostatic layer.
 4. The protective suit with the air supply device according to claim 1, wherein a waistband is (21) arranged at a joint of the tops portion (10) and the bottoms portion (20), a suspending portion (31) is arranged on the air supply device (30), and the air supply device is installed on the waistband (21) through the suspending portion (31).
 5. The protective suit with the air supply device according to claim 1, wherein a locking portion (1043) is arranged inside the battery lid (105), the locking portion (1043) is in parallel connection with an operation portion (1045) arranged outside the battery lid (105), an installing slot (1042) is arranged on the battery lid (105), a second elastic member (1044) is arranged inside the installing slot (1042), a top of the installing slot (1042) is provided with a through hole (1052) correspondingly to the locking portion (1043), the locking portion (1043) is connected to a free end of the second elastic member (1044) and capable of sliding along the installing slot (1042); and in a locking state, a top end of the locking portion (1043) stretches out of the installing slot (1042) and resists to a side wall of the battery cavity (72).
 6. The protective suit with the air supply device according to claim 5, wherein one end of the clamping portion (104) is provided with a clamping connection base (1041), which is installed on an inner wall of the battery lid (105) and provided with the installing slot (1042), the battery lid (105) is provided with an operation hole (1053) correspondingly to the operation portion (1045), and the operation portion (1045) passes through the operation hole (1053) and one end of the operation portion (1045) stretches into the installing slot (1042) and is connected to the locking portion (1043).
 7. The protective suit with the air supply device according to claim 1, wherein the hook (103) is a Z-shaped structure, which comprises a fastening portion (1031) located at one end, a hinge portion (1032) located at the other end, and a connecting portion (1033) connected to the fastening portion (1031) and the hinge portion (1032); and an obtuse angle is formed between the hinge portion (1032) and the connecting portion (1033), and the fastening portion (1031) is vertical to the connecting portion (1033).
 8. The protective suit with the air supply device according to claim 7, wherein a connecting position of the fastening portion (1031) and the connecting portion (1033) is set as an inclined surface, an outer end face of the fastening portion (1031) is a plane, the plane intersects with the inclined surface to form an obtuse angle tip (1034), and the clamping portion (104) is provided with an obtuse angle slot (1040) correspondingly to the obtuse angle tip (1034).
 9. The protective suit with the air supply device according to claim 5 or 6, wherein the second elastic member (1044) comprises first springs (1046) arranged at two sides of a bottom of the installing slot (1042), the two sides of the bottom end of the locking portion (1043) are provided with connecting ear plates (1047) in respective, and the connecting ear plates (1047) are connected to free ends of the first springs (1046).
 10. The protective suit with the air supply device according to claim 9, wherein two sides of the second elastic member (1044) are provided with chutes (1048), and one end of each chute (1048) is provided with an opening (1049) capable of containing the locking portion (1043) to slide only, and the other end of each chute (1048) is provided with a limiting member (1050) correspondingly to each first spring (1046).
 11. The protective suit with the air supply device according to claim 1, wherein the filter box (9) comprises an filter upper shell (1), which is inverted groove-shaped, a filter membrane (11) is arranged in the groove shape, a lower end opening of the groove shape is provided with a sealing cover (12), the filter upper shell (1) is buckled with the filter lower shell (14), and a filter membrane rubber mat (13) is arranged in a buckling gap.
 12. The protective suit with the air supply device according to claim 11, wherein the filter upper shell (1) is hung with one end of the filter lower shell (14), the other end of the filter upper shell (1) is provided with a bolt (202), the filter lower shell (14) is provided with

a locking portion (207) correspondingly to the bolt (202), the locking portion (207) comprises a key fixing frame (2023) arranged at a lower side of the filter lower shell (14), the key fixing frame (2023) is connected to a locking key (2022) through a third elastic member (2026), the locking key (2022) and the filter lower shell (14) are provided with bolt holes (2021) correspondingly to the bolt (202), the bolt (202) bends and stretches inside the filter upper shell (1) to form a hanging portion (2028), and an inner end face of the locking key (2022) bends and stretches to the bolt holes (2021) and forms a limiting portion (2027), and the limiting portion (2027) corresponds to the bolt (202).

13. The protective suit with the air supply device according to claim 12, wherein the hanging portion (2028) is vertical to the bolt (202) to form a straight hook, and the limiting portion (2027) is obliquely arranged.
14. The protective suit with the air supply device according to claim 12, wherein the third elastic member (2026) comprises a second spring (2029), two sides of the locking key (2022) stretch out of a mounting portion (2024), the mounting portion (2024) is provided with a guide column (2025) correspondingly to the second spring (2029), and the guide column (2025) stretches into the second spring (2029) to be coaxial with the second spring (2029).
15. The protective suit with the air supply device according to claim 12, wherein a cap peak (208) which is vertical to a groove-shaped side wall is arranged at an opened edge of the filter upper shell (1), the bolt (202) is located at a lower side of the cap peak (208) and vertical to the cap peak (208), the groove-shaped side wall is provided with hanging columns (206), and one end of an upper side of the filter lower shell (14) is provided with claw hooks (203) correspondingly to the hanging columns (206).
16. The protective suit with the air supply device according to claim 15, wherein an upper side of the filter lower shell (14) is a U-shaped groove structure and fits with the filter upper shell (1), a lower side of the filter lower shell is an inverted U-shaped structure and fits with the bottom shell (7), and the upper side of the filter lower shell (14) is vertical to a U-shaped section of the lower side; and a side wall of the inverted U-shaped structure is provided with mounting holes (1051), which correspond to outer end faces of the battery lid (105) and the locking key (2022), and the battery lid (105) and the locking key (2022) are located at two side walls of the inverted U-shaped structure in respective.
17. The protective suit with the air supply device according to claim 16, wherein two sides of the bolt hole

(2021) of the U-shaped groove are provided with a plurality of locating columns (205), and the cap peak (208) is provided with locating holes (204) correspondingly to the locating columns (205).

Patentansprüche

1. Ein Schutzanzug mit Luftzufuhrvorrichtung, **dadurch gekennzeichnet, dass** der Schutzanzug ein oberes Bekleidungsteil (10), ein unteres Bekleidungsteil (20) und eine transparente Kapuze (50) umfasst, die einstückig ausgebildet sind, wobei das obere Bekleidungsteil (10) einen in sein Inneres gemündeten Atemschlauch (60) aufweist, wobei ein Lufteinlass des Atemschlauchs (60) mit der Luftzufuhrvorrichtung (30) verbunden ist, wobei ein Oberseite der transparenten Kapuze (50) einen Abgasfilter (70) aufweist, wobei die Luftzufuhrvorrichtung (30) eine obere Abdeckung (8), ein Bodengehäuse (7), einen zwischen der oberen Abdeckung (8) und dem Bodengehäuse (7) angeordneten Filterkasten (9), ein unteres Filtergehäuse (14), ein Gebläse (2) und eine Batterie (107) zum Antrieb des Gebläses (2) umfasst, wobei der Filterkasten (9) zwischen der oberen Abdeckung (8) und dem unteren Filtergehäuse (14) angeordnet ist, wobei das Gebläse (2) und die Batterie (107) zwischen dem unteren Filtergehäuse (14) und dem Bodengehäuse (7) angeordnet sind, wobei ein Batteriefach (71) in dem Bodengehäuse (7) vorgesehen ist, wobei die Randkanten der oberen Abdeckung (8), des unteren Filtergehäuses (14) und des Bodengehäuses (7) miteinander in Eingriff stehen, wobei im Eingriffszustand das Batteriefach (71) und das untere Filtergehäuse (14) eine Batteriekammer (72) zum Einklemmen der Batterie (107) bilden, wobei eine Batterieöffnung (73) und eine Batterieabdeckung (105), die die Batteriekammer (72) zugeordnet sind, an einer Seite des unteren Filtergehäuses (14) vorgesehen sind, wobei eine der Schenkel der Batterieabdeckung (105) an der Batterieöffnung (73) scharniert ist und an einem anderen Schenkel, der dem scharnierten Schenkel gegenüberliegt, eine Verrastung (104) vorgesehen ist, wobei ein erstes elastisches Element (106) an einer der Batterieabdeckung (105) zugewandt Innenwand in der Batteriekammer (72) vorgesehen ist, wobei ein Haken (103) an einer Seite neben der Batterieabdeckung (105) in der Batteriekammer (72) gelenkig verbunden ist, wobei eine Torsionsfeder (101) an einer Gelenkwelle (102) des Hakens (103) vorgesehen ist, wobei im Eingriffszustand die Batterie (107) zwischen dem Haken (103) und dem ersten elastischen Element (106) einrastet, wobei die Verrastung (104) der Batterieabdeckung (105) zwischen der Batteriekammer (72) und dem Haken (103) einrastet.

2. Schutzanzug mit Luftzufuhrvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** an dem unteren Bekleidungsabschnitt (20) eine Anziehhöf-
nung (40) vorgesehen ist, wobei sich die Anziehhöf-
nung (40) nach oben zu der transparenten Kapuze
(50) erstreckt, wobei in der Anziehhöf-
nung (40) ein Reißverschluss (80) vorgesehen ist, der vom unteren Ende der Anziehhöf-
nung (40) beginnt und am oberen Ende der Anziehhöf-
nung (40) endet (40). 5
3. Schutzanzug mit Luftzufuhrvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** der Schutzanzug eine dreischichtige Struktur aufweist, wobei eine äußere Schicht eine kratzfeste Schicht und eine mittlere Schicht eine Isolationsschicht ist und eine innere Schicht eine antibakterielle Schicht ist. 10
4. Schutzanzug mit Luftzufuhrvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** ein Gürtel (21) an einer Verbindungsstelle zwischen dem oberen Bekleidungsteil (10) und dem unteren Bekleidungsteil (20) vorgesehen ist, wobei ein Aufhängeelement (31) an der Luftzufuhrvorrichtung (30) vorgesehen ist, wobei die Luftzufuhrvorrichtung mittels des Aufhängeelements (31) an dem Gürtel (21) angeordnet ist. 15
5. Schutzanzug mit Luftzufuhrvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** in der Batterieabdeckung (105) ein Verriegelungselement (1043) vorgesehen ist, das mit einem außerhalb der Batterieabdeckung (105) angeordneten Betätigungselement (1045) verbunden ist, wobei eine Montagenut (1042) an der Batterieabdeckung (105) vorgesehen ist, wobei ein zweites elastisches Element (1044) in der Montagenut (1042) vorgesehen ist, wobei ein Durchgangsloch (1052), das das Verriegelungselement (1043) zugeordnet ist, an einer Oberseite der Montagenut (1042) vorgesehen ist, wobei das Verriegelungselement (1043) mit einem freien Ende des zweiten elastischen Elements (1044) gekoppelt ist und entlang der Montagenut (1042) verschiebbar ist, wobei im verriegelten Zustand ein Ende des Verriegelungselements (1043) aus der Montagenut (1042) herausragt und an einer Seitenwand der Batteriekammer (72) anliegt. 20
6. Schutzanzug mit Luftzufuhrvorrichtung nach Anspruch 5, **dadurch gekennzeichnet, dass** eine Verastungsbasis (1041) an einem Ende der Verastung (104) vorgesehen ist, wobei die Verastungsbasis (1041) an der Innenwand der Batterieabdeckung (105) angeordnet ist, wobei die Montagenut (1042) an der Verastungsbasis (1041) vorgesehen ist, wobei ein das Betätigungselement zugeordnetes Betätigungsloch (1053) in der Batterieabdeckung (105) vorgesehen ist, wobei das Betätigungselement (1045) durch das Betätigungsloch (1053) hindurchgeht, wobei sich ein Ende des Betätigungselements in die Montagenut (1042) erstreckt und mit einem Verriegelungselement (1043) verbunden ist. 25
7. Schutzanzug mit Luftzufuhrvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** der Haken (103) eine Z-förmige Struktur hat, die einen an einem Ende angeordneten Klemmabschnitt (1031), einen an einem anderen Ende angeordneten Gelenkabschnitt (1032), und einen Verbindungsabschnitt (1033) zwischen dem Klemmabschnitt (1031) und dem Gelenkabschnitt (1032) umfasst, wobei der Gelenkabschnitt (1032) in einem stumpfen Winkel mit dem Verbindungsabschnitt (1033) eingeschlossen ist und der Klemmabschnitt (1031) und der Verbindungsabschnitt (1033) senkrecht zueinander stehen. 30
8. Schutzanzug mit einer Luftzufuhrvorrichtung nach Anspruch 7, **dadurch gekennzeichnet, dass** die Verbindungsstelle zwischen dem Klemmabschnitt (1031) und dem Verbindungsabschnitt (1033) als Schrägfläche ausgebildet ist, wobei die Außenseite des Klemmabschnitts (1031) eine Flachfläche ist, wobei die Flachfläche und die Schrägfläche zu einer stumpfwinkligen Spitze (1034) zusammenlaufen, wobei der Klemmabschnitt (104) mit einem Schlitz (1040) für die stumpfwinklige Spitze versehen ist, der der stumpfwinkligen Spitze entspricht. 35
9. Schutzanzug mit einer Luftzufuhrvorrichtung nach Anspruch 5 oder 6, **dadurch gekennzeichnet, dass** das zweite elastische Element (1044) die ersten Federn (1046) umfasst, die auf beiden Seiten des Bodens der Montagenut (1042) angeordnet sind, wobei auf beiden Seiten des unteren Endes des Verriegelungselements (1043) Verbindungsansätze (1047) vorgesehen sind, die jeweils mit den freien Enden der ersten Federn (1046) verbunden sind. 40
10. Schutzanzug mit Luftzufuhrvorrichtung nach Anspruch 9, **dadurch gekennzeichnet, dass** auf beiden Seiten des zweiten elastischen Elements (1044) eine Gleitschiene (1048) vorgesehen ist, wobei an einem Ende der Gleitschiene (1048) eine Öffnung (1049) vorgesehen ist, um nur das Gleiten des Verriegelungselements (1043) anzupassen, wobei an einem anderen Ende der Gleitschiene (1048) Begrenzungselements (1050) vorgesehen sind, die die jeweiligen ersten Federn (1046) jeweils zugeordnet sind. 45
11. Schutzanzug mit Luftzufuhrvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** der Filterkasten (9) ein oberes Filtergehäuse (1) aufweist, wobei das obere Filtergehäuse (1) als umgedrehte Nut ausgebildet ist, in der eine Filtermembran (11) 50

vorgesehen ist, wobei an einem offenen unteren Ende der Nut eine Dichtkappe (12) vorgesehen ist, wobei das obere Filtergehäuse (1) und das untere Filtergehäuse (14) zusammengefügt sind, wobei am Fügespalt ein Filtermembran-Auflage (13) vorgesehen ist.

12. Schutzanzug mit Luftzufuhrvorrichtung nach Anspruch 11, **dadurch gekennzeichnet, dass** das obere Filtergehäuse (1) an einem Ende mit dem unteren Filtergehäuse (14) gekoppelt ist, wobei das obere Filtergehäuse (1) an einem anderen Ende eine Verriegelungszunge (202) aufweist, wobei das untere Filtergehäuse (14) ein die Verriegelungszunge (202) zugeordnetes Verschlusssteil (207) aufweist, das einen Tastenhalter (2023) umfasst, der an einer Unterseite des unteren Filtergehäuses (14) angeordnet ist, wobei der Tastenhalter (2023) durch ein drittes elastisches Element (2026) mit einer Verriegelungstaste (2022) verbunden ist, wobei die Verriegelungstaste (2022) und das untere Filtergehäuse (14) ein der Verriegelungszunge (202) entsprechendes Loch (2021) für Verriegelungszunge aufweisen, wobei die Verriegelungszunge (202) sich gekrümmt in Richtung des Inneren des oberen Filtergehäuses (1) erstreckt und einen Kupplungsabschnitt (2028) bildet, wobei die innere Endfläche der Verriegelungstaste (2022) sich gekrümmt in Richtung des Lochs (2021) für Verriegelungszunge erstreckt und eine Begrenzung (2027) bildet, wobei die Begrenzung (2027) die Verriegelungszunge (202) zugeordnet ist.

13. Schutzanzug mit Luftzufuhrvorrichtung nach Anspruch 12, **dadurch gekennzeichnet, dass** der Kupplungsabschnitt (2028) und die Verriegelungszunge (202) senkrecht zueinander stehen und einen rechtwinkligen Haken bilden, wobei die Begrenzung (2027) schräg ausgebildet ist.

14. Schutzanzug mit Luftzufuhrvorrichtung nach Anspruch 12, **dadurch gekennzeichnet, dass** das dritte elastische Element (2026) eine zweite Feder (2029) umfasst, wobei sich ein Montageabschnitt (2024) von beiden Seiten der Verriegelungstaste (2022) heraus erstreckt, wobei der Montageabschnitt (2024) einen der zweiten Feder (2029) zugeordneten Führungsstift (2025) aufweist, wobei der Führungsstift (2025) sich innerhalb der zweiten Feder (2029) erstreckt und coaxial mit der zweiten Feder (2029) ist.

15. Schutzanzug mit Luftzufuhrvorrichtung nach Anspruch 12, **dadurch gekennzeichnet, dass** an einer offenen Kante des oberen Filtergehäuses (1) ein Flansch (208) senkrecht zur Seitenwand der Nut vorgesehen ist, wobei sich die Verriegelungszunge (202) an einer Unterseite des Flansches (208) und

senkrecht zum Flansch (208) befindet, wobei an der Seitenwand der Nut eine Hängesäule (206) vorgesehen ist, wobei an einem Ende der Oberseite des unteren Filtergehäuses (14) entsprechend der Hängesäule (206) ein Rasthaken vorgesehen ist.

16. Schutzanzug mit Luftzufuhrvorrichtung nach Anspruch 15, **dadurch gekennzeichnet, dass** die Oberseite des unteren Filtergehäuses (14) als U-förmige Nut ausgebildet und mit dem oberen Filtergehäuse (1) angepasst ist, wobei die Unterseite des unteren Filtergehäuses als umgekehrte U-förmige Struktur ausgebildet und mit dem Bodengehäuse (7) angepasst ist, wobei die Querschnitte der U-Form der Oberseite und der Unterseite des unteren Filtergehäuses (14) senkrecht zueinander sind, wobei an den Seitenwänden der umgedrehten U-förmigen Struktur Montagelöcher (1051) vorgesehen sind, die jeweils die Außenflächen der Batterieabdeckung (105) und der Verriegelungstaste (2022) zugeordnet sind, wobei die Batterieabdeckung (105) und die Verriegelungstaste (2022) jeweils an den beiden Seitenwänden der umgedrehten U-förmigen Struktur angeordnet sind.

17. Schutzanzug mit Luftzufuhrvorrichtung nach Anspruch 16, **dadurch gekennzeichnet, dass** eine Vielzahl von Positionierungsstift (205) auf beiden Seiten des Lochs (2021) für Verriegelungszunge der U-förmigen Nut vorgesehen sind, wobei der Flansch (208) Positionierungslöcher (204) aufweist, die den Positionierungsstifte (205) entsprechen.

Revendications

1. Combinaison de protection ayant un dispositif d'alimentation en air, **caractérisée en ce que**, elle comprend une partie de vêtement supérieure (10), une partie de vêtement inférieure (20) et une cagoule transparente (50) qui sont formés d'un seul tenant, dans laquelle la partie de vêtement supérieure (10) est pourvue d'un tube respiratoire (60) en communication avec l'environnement interne de la combinaison de protection, une entrée d'air du tube respiratoire (60) est en communication avec un dispositif d'alimentation en air (30), et un dispositif de filtre d'échappement (70) est disposé au sommet de la cagoule transparente (50) ;
le dispositif d'alimentation en air (30) comprend un couvercle supérieur (8) et une coque inférieure (7) ; un boîtier de filtre (9), une coque inférieure de filtre (14), une soufflerie (2) et une batterie (107) pour faire tourner la soufflerie sont disposés entre le couvercle supérieur (8) et la coque inférieure (7) ; le boîtier de filtre (9) se trouve entre le couvercle supérieur (8) et la coque inférieure de filtre (14) ; la soufflerie (2) et la batterie (107) se trouvent entre la coque inférieure

- de filtre (14) et la coque inférieure (7) ; un logement de batterie (71) est disposé dans la coque inférieure (7) ; des bords du couvercle supérieur (8), de la coque inférieure de filtre (14) et de la coque inférieure (7) sont bouclés ; à un état bouclé, le logement de batterie (71) et la coque inférieure de filtre (14) forment une cavité de batterie (72) permettant de serrer la batterie (107) ; une partie latérale de la coque inférieure de filtre (14) est pourvue d'une ouverture de batterie (73) correspondant à la cavité de batterie (72) et d'un couvercle de batterie (105) ; un bord latéral du couvercle de batterie (105) est articulé avec l'ouverture de batterie (73), l'autre bord opposé au bord articulé est pourvu d'une partie de serrage (104) ; une paroi intérieure de la cavité de batterie (72) opposée au couvercle de batterie (105) est pourvue d'un premier élément élastique (106) ; un crochet de serrage est articulé avec la partie latérale dans la cavité de batterie (72), qui est adjacente au couvercle de batterie (105) ; et un ressort de torsion (101) est disposé sur un arbre articulé (102) du crochet de serrage (103) ; à l'état bouclé, la batterie (107) est serrée entre le crochet de serrage (103) et le premier élément élastique (106), et la partie de serrage (104) du couvercle de batterie (105) est serrée entre la cavité de batterie (72) et le crochet de serrage (103).
2. Combinaison de protection ayant un dispositif d'alimentation en air selon la revendication 1, dans laquelle la partie de vêtement inférieure (20) est pourvue d'une ouverture pour le port de vêtements (40), l'ouverture pour le port de vêtements (40) s'étend vers le haut jusqu'à la cagoule transparente (50), une fermeture à glissière (80) est disposée dans l'ouverture pour le port de vêtements (40), le point de départ de la fermeture à glissière (80) est positionné au niveau d'une extrémité inférieure de l'ouverture pour le port de vêtements (40), et le point d'arrivée de la fermeture à glissière est positionné au niveau d'une extrémité supérieure de l'ouverture pour le port de vêtements (40).
3. Combinaison de protection ayant un dispositif d'alimentation en air selon la revendication 1, dans laquelle la combinaison de protection a une structure à trois couches, dont la couche extérieure est une couche résistante aux rayures, la couche intermédiaire est une couche d'isolement et la couche intérieure est une couche antibactérienne.
4. Combinaison de protection ayant un dispositif d'alimentation en air selon la revendication 1, dans laquelle la partie reliant la partie de vêtement supérieure (10) et la partie de vêtement inférieure (20) est pourvue d'une ceinture (21), et le dispositif d'alimentation en air (30) est pourvu d'une partie de suspension (31) et est disposé sur la ceinture (21) par

l'intermédiaire de la partie de suspension (31).

5. Combinaison de protection ayant un dispositif d'alimentation en air selon la revendication 1, dans laquelle le couvercle de batterie (105) est pourvu d'une partie d'arrêt (1043), la partie d'arrêt (1043) est associée à une partie de fonctionnement (1045) disposée à l'extérieur du couvercle de batterie (105), le couvercle de batterie (105) est pourvu d'une rainure d'installation (1042), la rainure d'installation (1042) est pourvue d'un second élément élastique (1044), la rainure d'installation (1042) est pourvue d'un trou traversant (1052) au sommet correspondant à la partie d'arrêt (1043), la partie d'arrêt (1043) est reliée à l'extrémité libre du second élément élastique (1044) et peut être glissée le long de la rainure d'installation (1042), et à l'état verrouillé, le haut de la partie d'arrêt (1043) s'étend hors de la rainure d'installation (1042) et repose contre la paroi latérale de la cavité de batterie (72).
6. Combinaison de protection ayant un dispositif d'alimentation en air selon la revendication 5, dans laquelle un siège de connexion de serrage (1041) est disposé au niveau d'une extrémité de la partie de serrage (104), le siège de connexion de serrage (1041) est installé sur la paroi intérieure du couvercle de la batterie (105), une rainure d'installation (1042) est formée dans le siège de connexion de serrage (1041), un trou de fonctionnement (1053) est formé dans le couvercle de batterie (105) correspondant à la partie de fonctionnement (1045), la partie de fonctionnement (1045) traverse le trou de fonctionnement (1053), et une extrémité de la partie de fonctionnement s'étend dans la rainure d'installation (1042) pour être reliée à la partie d'arrêt (1043).
7. Combinaison de protection ayant un dispositif d'alimentation en air selon la revendication 1, dans laquelle le crochet de serrage (103) a une structure en forme de Z, la structure en forme de Z comprend une partie de blocage (1031) au niveau d'une extrémité, une partie d'articulation (1032) au niveau de l'autre extrémité et une partie de liaison (1033) destinée à relier la partie de blocage (1031) et la partie d'articulation (1032), la partie d'articulation (1032) et la partie de liaison (1033) forment un angle obtus, et la partie de blocage (1031) est perpendiculaire à la partie de liaison (1033).
8. Combinaison de protection ayant un dispositif d'alimentation en air selon la revendication 7, dans laquelle une surface inclinée est disposée au niveau de la position de liaison entre la partie de blocage (1031) et la partie de liaison (1033), la surface d'extrémité extérieure de la partie de blocage (1031) est plane, et la surface plane et la surface inclinée se croisent et forment une extrémité pointue à angle

obtus (1034), une rainure à angle obtus (1040) est disposée au niveau de la partie de serrage (104) correspondant à l'extrémité pointue à angle (1034).

9. Combinaison de protection ayant un dispositif d'alimentation en air selon la revendication 5 ou 6, dans laquelle le deuxième élément élastique (1044) comprend un premier ressort (1046) disposé des deux côtés inférieurs de la rainure d'installation (1042), une plaque à oreilles de liaison (1047) est disposée des deux côtés inférieurs de la partie d'arrêt (1043), la plaque à oreilles de liaison (1047) est reliée à une extrémité libre du premier ressort (1046). 5
10. Combinaison de protection ayant un dispositif d'alimentation en air selon la revendication 9, dans laquelle les deux côtés du deuxième élément élastique (1044) sont pourvus d'une glissière (1048), une extrémité de la glissière (1048) est pourvue d'une ouverture (1049) destinée uniquement à accueillir le glissement de la partie d'arrêt (1043), et l'autre extrémité de la glissière (1048) est pourvue d'un élément de limitation (1050) correspondant au premier ressort (1046) respectif. 10
11. Combinaison de protection ayant un dispositif d'alimentation en air selon la revendication 1, dans laquelle le boîtier de filtre (9) comprend une coque supérieure de filtre (1), la coque supérieure de filtre (1) est une cellule inversée, une membrane filtrante (11) est disposée dans la cellule, un capuchon de fermeture (12) est disposé au niveau de l'extrémité inférieure non fermée de la cellule, la coque supérieure de filtre (1) et la coque inférieure de filtre (14) sont bouclées, et un coussin de membrane filtrante (13) est disposé entre l'espace. 20
12. Combinaison de protection ayant un dispositif d'alimentation en air selon la revendication 11, dans laquelle la coque supérieure de filtre (1) s'articule à une extrémité de la coque inférieure de filtre (14), l'autre extrémité de la coque supérieure de filtre (1) est pourvue d'une languette de verrouillage (202), une partie de verrouillage (207) est disposée sur la coque inférieure de filtre (14) correspondante à la languette de verrouillage (202), la partie de verrouillage (207) comprend un support de clé (2023) disposé sur le côté inférieur de la coque inférieure de filtre (14), le support de clé (2023) est relié à une clé de verrouillage (2022) par l'intermédiaire d'un troisième élément élastique (2026), la clé de verrouillage (2022) et la coque inférieure de filtre (14) sont pourvus d'un trou de languette (2021) correspondant à la languette de verrouillage (202), la languette de verrouillage (202) se plie et s'étend vers l'intérieur de la coque supérieure de filtre (1) pour former une partie d'accrochage (2028), une surface d'extrémité intérieure de la clé de verrouillage (2022) 25

se plie et s'étend vers le trou de languette (2021) pour former une partie de limitation (2027), la partie de limitation (2027) correspond à la languette de verrouillage (202).

13. Combinaison de protection ayant un dispositif d'alimentation en air selon la revendication 12, dans laquelle la partie d'accrochage (2028) est perpendiculaire à la languette de verrouillage (202) pour former un crochet droit, et la partie de limitation (2027) est disposée à un angle. 30
14. Combinaison de protection ayant un dispositif d'alimentation en air selon la revendication 12, dans laquelle le troisième élément élastique (2026) comprend un second ressort (2029), une partie de montage (2024) s'étend sur deux côtés de la clé de verrouillage (2022), un poteau de guidage (2025) est disposé sur la partie de montage (2024) correspondant au second ressort (2029), et le poteau de guidage (2025) s'étend dans le second ressort (2029) et est coaxial avec le second ressort (2029). 35
15. Combinaison de protection ayant un dispositif d'alimentation en air selon la revendication 12, dans laquelle le bord non couvert de la coque supérieure de filtre (1) est pourvu d'un bord de capuchon (208) vertical à la paroi latérale de la cellule, la languette de verrouillage (202) est située dans la partie inférieure du bord de capuchon (208) et verticale au bord de capuchon (208), une cheville (206) est disposée à la paroi latérale de la cellule, un crochet (203) est disposé au niveau d'une extrémité de la partie supérieure de la coque inférieure de filtre (14) correspondant à la cheville (206). 40
16. Combinaison de protection ayant un dispositif d'alimentation en air selon la revendication 15, dans laquelle une face supérieure de la coque inférieure de filtre (14) est une structure en forme de U qui est adaptée à la coque supérieure de filtre (1), une face inférieure de la coque inférieure de filtre une structure en forme de U inversé qui est adaptée à la coque inférieure (7), des sections transversales en forme de U des faces supérieure et inférieure de la coque inférieure de filtre (14) sont verticales ; un trou de montage (1051) est formé dans la paroi latérale de la structure en forme de U inversé et correspondent aux faces d'extrémité extérieures du couvercle de batterie (105) et de la clé de verrouillage (2022), respectivement, le couvercle de batterie (105) et la clé de verrouillage (2022) sont situés sur deux parois latérales de la structure en forme de U inversé, respectivement. 45
17. Combinaison de protection ayant un dispositif d'alimentation en air selon la revendication 16, dans laquelle une pluralité de colonnes de positionnement 50

(205) sont disposées sur deux côtés d'un trou de languette (2021) de la rainure en U, et des trous de positionnement (204) sont disposés dans le bord de capuchon (208) correspondant aux colonnes de positionnement (205).

5

10

15

20

25

30

35

40

45

50

55

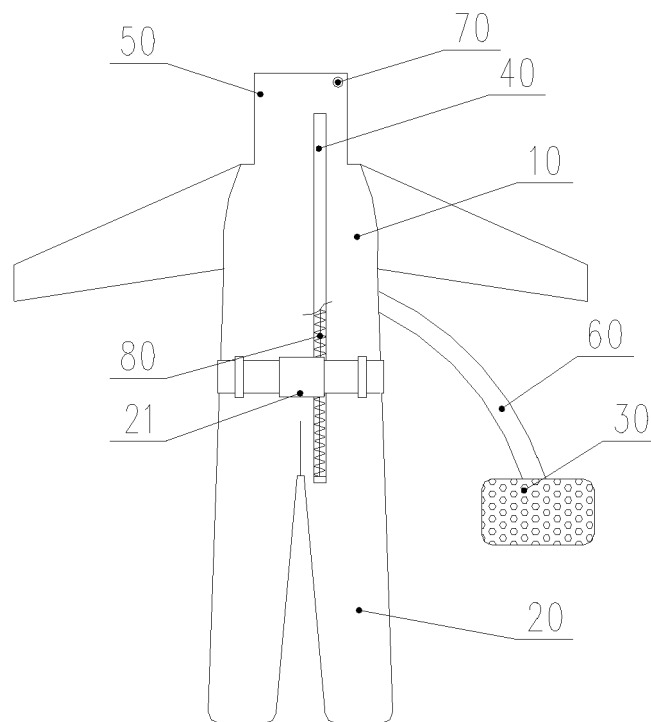


FIG. 1

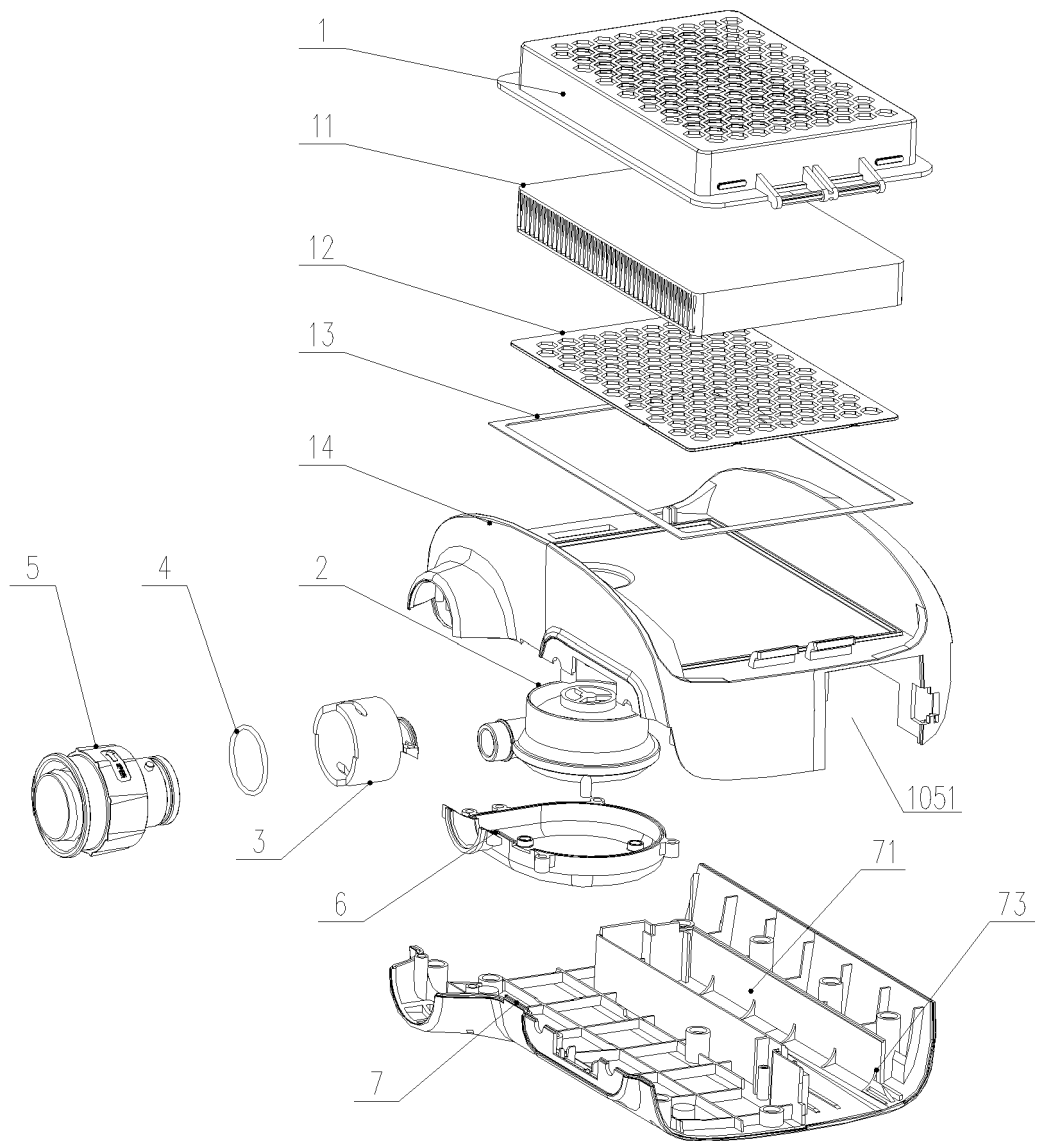


FIG. 2

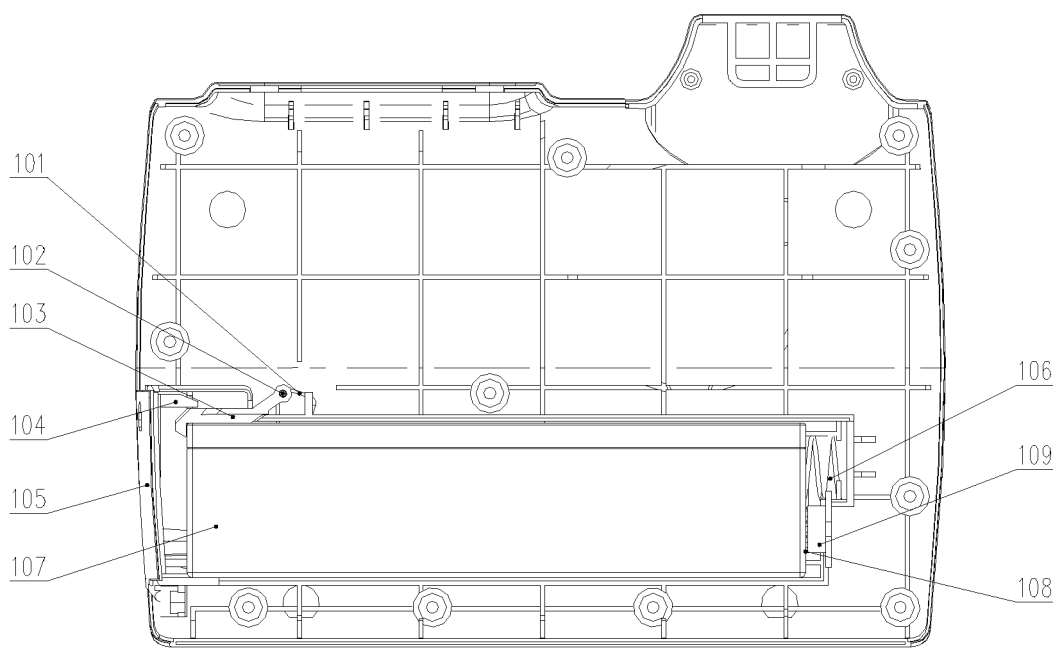


FIG. 3

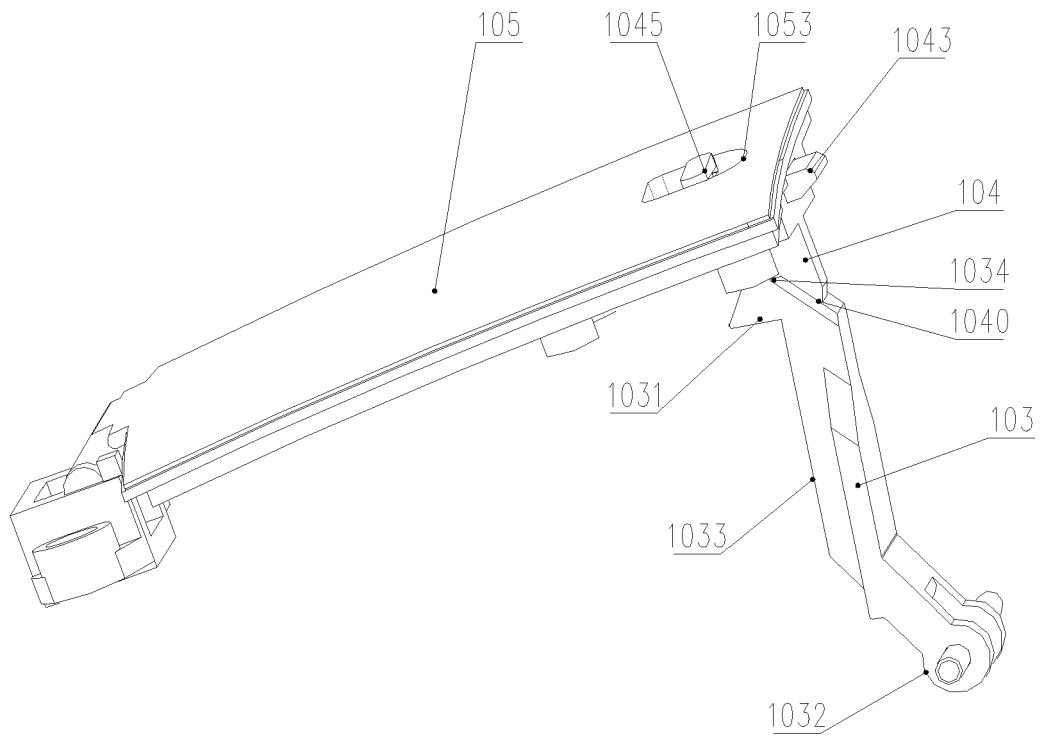


FIG. 4

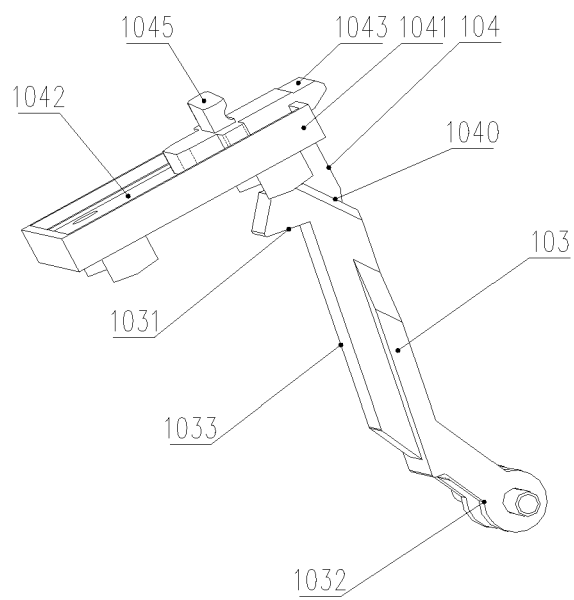


FIG. 5

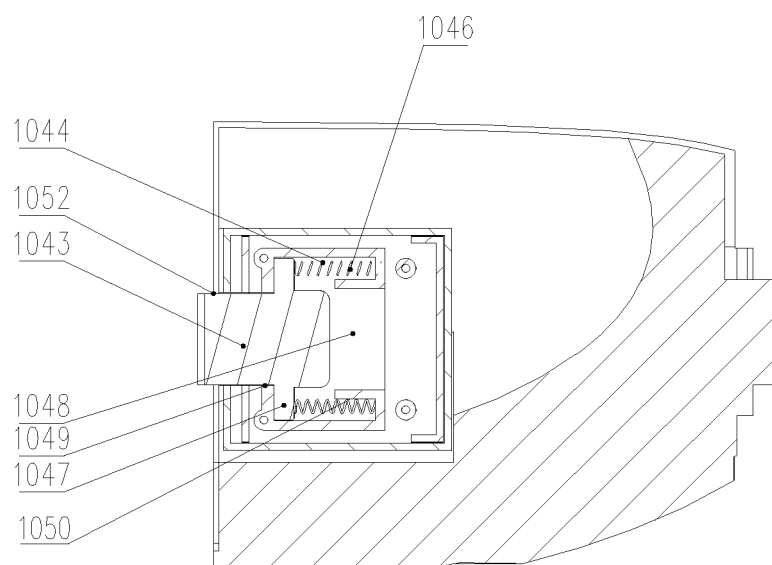


FIG. 6

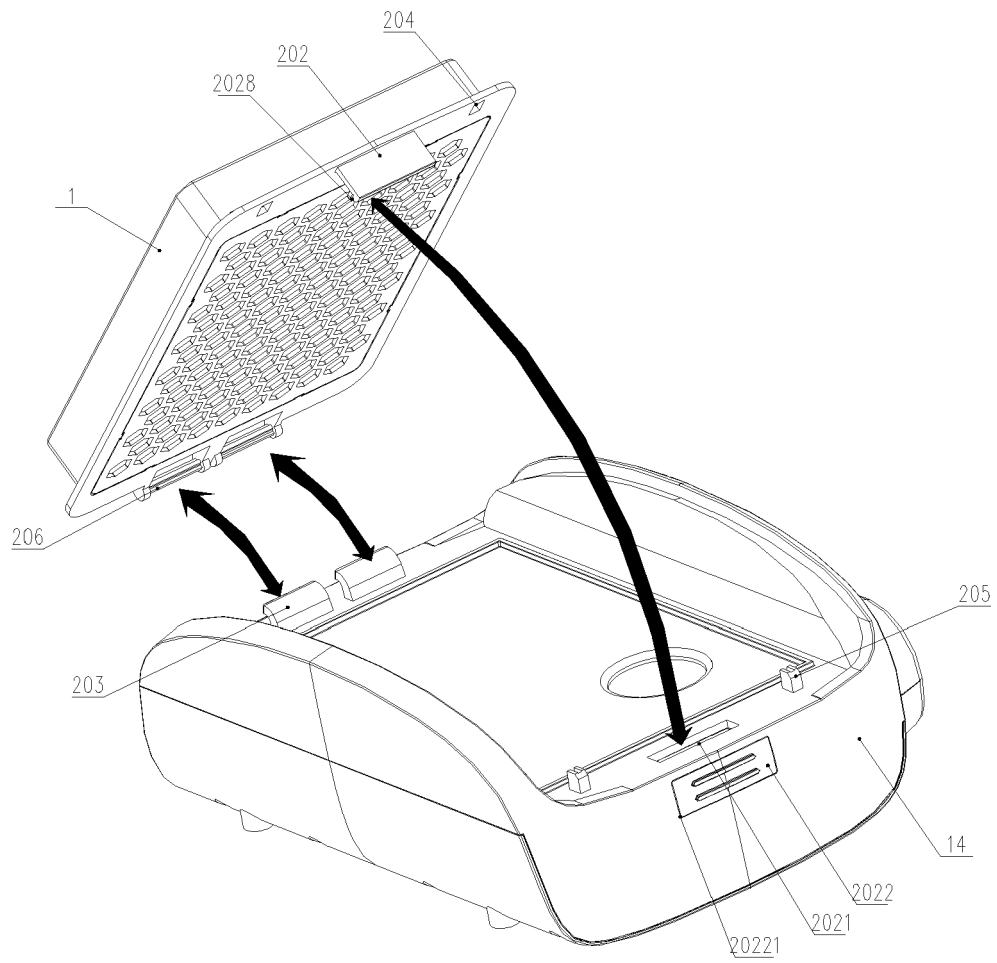


FIG. 7

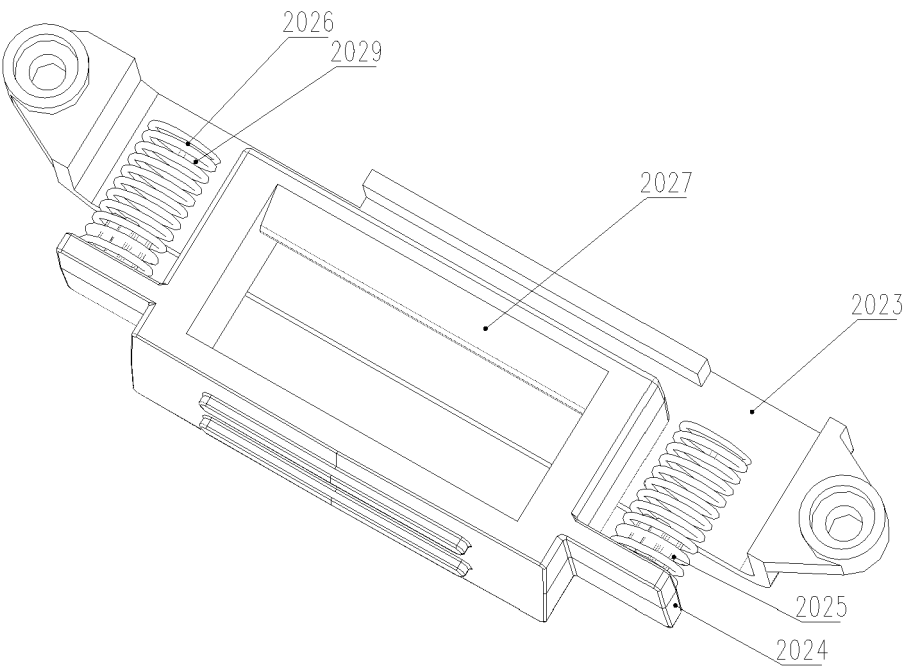


FIG. 8

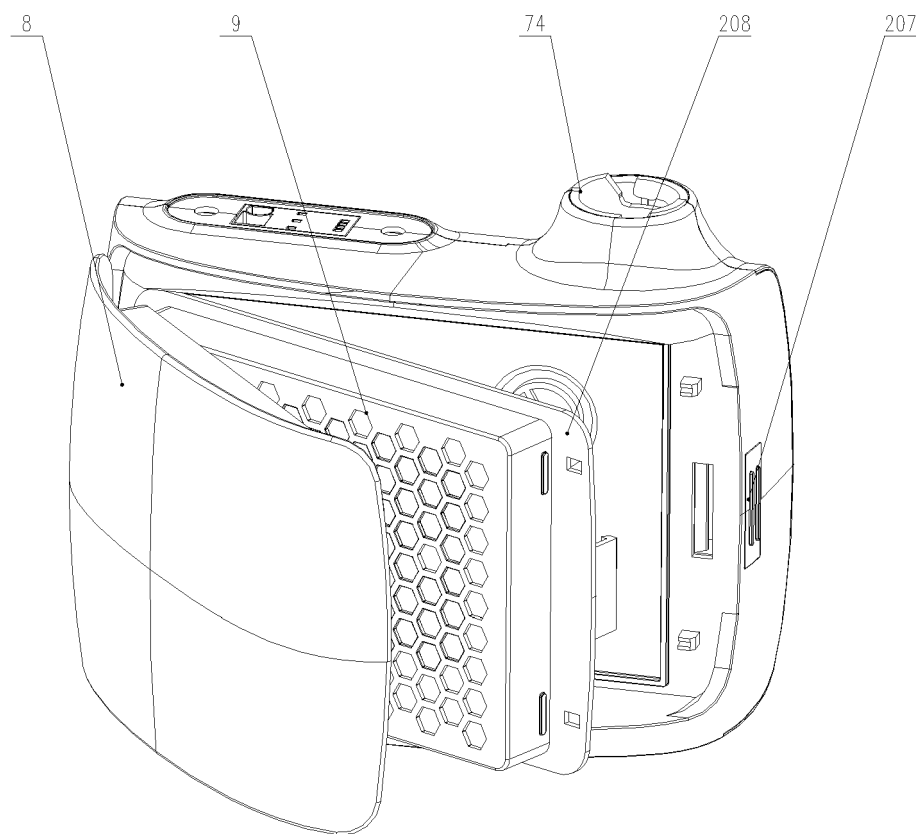


FIG. 9

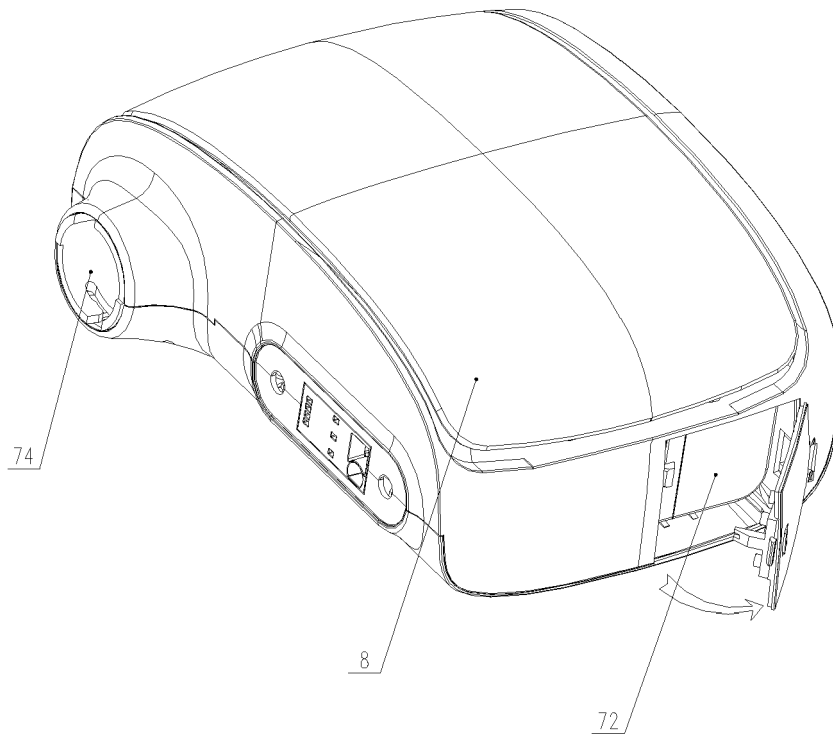


FIG. 10

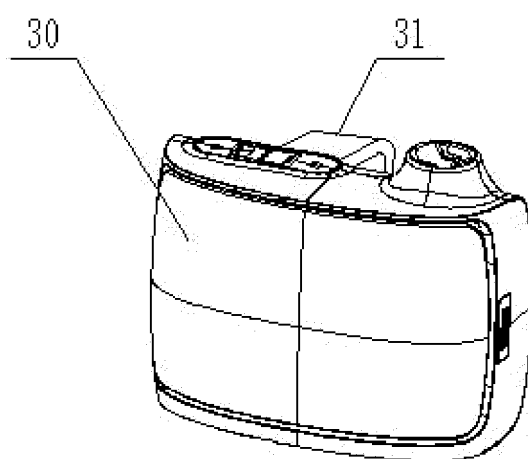


FIG. 11

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- CN 2730167 Y [0003]
- EP 2818204 A1 [0004]
- KR 101840600 B1 [0005]